farm machinery costs
as a guide to custom rates

spring
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PREFACE

As the demand for custom work increases, farmers in Alberta continue to seek information on machinery costs and custom rates. Custom operators want to ensure they are charging enough to cover their costs and farmers hiring custom operators are concerned that a fair price is paid for the work being done.

Since 1975, Alberta Agriculture has annually published this guide to machinery costs. This publication provides current machinery cost information as a basis for negotiating fair custom rates for farm machinery operations. It is also a useful guide to budgeting machinery costs for other purposes. The best decision information, however, is the actual costs for your specific machine. Because of the variability in machinery cost between farms, we strongly urge use of the worksheets (on page 13 and 14) to calculate these costs for your decision.

A custom operator's costs are only one side of the negotiations. Market rates for the 1985 season provide a second reference point. Some alternative approaches to using this information are suggested on page 1. Some points to consider in custom hiring agreements are listed on page 12.

It continues to be difficult to accurately estimate the replacement cost of machines. Creative pricing programs and variation between dealers tended to obscure the real capital cost of equipment. Although the list price has increased slightly in many cases, the net price after a deal is made has not increased significantly. It certainly pays to shop around for both machines and financing deals in what has to be called a buyers market this spring. Operating costs are expected to decline in the early spring as the world oil price decline is reflected in lower fuel prices. Fuel rebates also lower the on-farm cost of fuel. Interest rates, unpredictable at best, are expected to range slightly higher. A change from the 1985 Guide to Custom Rates in the tractors is the inclusion a 200 hour annual use and the 400 hour annual use as the typical use figure. In the prior years a 600 hour annual use figure was typical.

We gratefully acknowledge the services of Cal Ausenhus who again conducted the machinery cost survey. Gerd Andres and Garth Nickorick from the Farm Business Management Branch of Alberta Agriculture also contributed to updating this publication. The Market Rate Survey data was provided from a joint-project with Statistics Branch.

We draw your attention to the orange brochure in the front of this publication. Since 1984, we have produced a publication titled "Directory of Custom Operators In Alberta". Our plan is to prepare a similar Directory of Custom Operators for 1987. Your cooperation in contributing to this directory will be appreciated.

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INTRODUCTION

Custom charges for farm operations can be arrived at in two ways:

1) Use the going rate for the job. The commercial market rates are surveyed and reported continuously by the Farm Business Management Branch. Relevant 1985 figures are listed in the "Market Rate" column of the cost tables in the text.

OR

2) Set the rate at a level such that some or all of the costs plus profit are covered.

This publication outlines steps in the buildup of costs incurred by some of the machinery units used in field and livestock operations. These costs are accumulated into a Full Cost + Profit Basis for a custom charge.

ASSUMPTIONS

1) Estimated years of life, annual hours of use and annual repair rates are specified for each class of machine.
2) Interest on average machine investment is charged at 14% per year.
3) Diesel fuel is charged at $.20 per litre, purple gas at $.24 per litre and propane at $.15 per litre.
(Changes in diesel and propane prices can be costed from the gallons per hour usage estimates, then applied to total cost per hour).
4) Labor is charged at $8.00 per hour.
5) Profit allowance on tractors only is calculated at 30% of variable cost.
6) Profit allowance on Self-Propelled Machines and Tractor plus Implement Units equals 40% of the sum of variable costs plus labor.
7) Calculations follow the procedures and assumptions of the worksheets included on pages 13 and 14.

FIXED COSTS

Hours of annual use have a major effect on fixed costs per hour. Three levels of annual use are listed for tractors and combines, so as to guide realistic custom or rental pricing.

The tractor costs associated with a 400 hour annual use are used in costing out all tractor driven operations. Substitute the 200 or 600 rates if they are more applicable.

If your annual use figures differ greatly from those listed, use this formula to adjust your Fixed Costs (FC) Per Hour: Your FC/Hr =

$$\frac{\text{Quoted FC/Hr x Quoted Annual Use In Hrs.}}{\text{Your Annual Use In Hrs.}}$$

HOW TO USE THE GUIDE

1) If you are a **full-time custom operator**, then use the Full Cost + Profit Basis for estimating a charge. Be sure to adjust fixed costs if your annual hours of use differ much from those quoted. The profit margin can be adjusted to meet the market conditions.

2) If you are doing custom work on a **good neighbor payment basis**, then fixed costs of owning the machine may be ignored since they represent an annual cost incurred whether or not custom work is done. However, the rate should cover all variable costs which include an allowance for repairs. Labor and profit margin can be adjusted to meet each situation.

3) If you plan to do custom work in addition to your own work, so as to partly justify ownership of a larger machine, then the custom charge should cover variable costs, labor, a profit margin **plus** a proportion of fixed costs calculated as follows:

Proportion of Fixed Costs =

$$\frac{\text{Hours of Custom Work}}{\text{Total Annual Hours of Use}} \times \text{Total Fixed Costs}$$

4) If you are renting out machinery, then you will wish to at least cover fixed costs and those variable costs such as lubrication and repairs which may not be already covered by the renter.
5) If you wish to assess a rate for a full operation such as silage making, which requires several machines, then add the hourly costs of each activity, making sure that there is neither omission nor duplication of men and units. Use worksheets on page 13 and 14.
6) The purchase cost estimates are based on average list prices less 10% as of February, 1986 for each class of machine. These represent current **replacement** costs which should be budgeted and charged for, even if you do custom work with older machines, unless the older machine will not do a comparable job.

OTHER CONSIDERATIONS

1) **Favorable or unfavorable working conditions** such as size of job, distance, access, contour, soil type and possible down time, must modify the guide figures. **Per hour** charges allow for some of these situations.
2) Charges per unit of output such as per acre, per bushel or per bale, defined on **work rates per hour**, may be quite different from those quoted. **Per hour charging** overcomes some of these uncertainties.
3) You can adjust the labor charge according to your actual cost of hired work or the opportunity cost of your own labor.
4) If your experience and farm records suggest that other costs and assumptions would suit your situation, then recalculate using the worksheets.
5) **Earlier and faster may be cheaper.**
There are $ penalties attached to late completion of operations. The $ rewards for timely quality work, quickly completed by large machines, is only earned if the support system, including seed and fertilizer supplies and grain trucking, is well organized.
6) Custom hiring is a business arrangement between two parties. Misunderstandings can be avoided by following the guidelines in page 12.

Such factors as tax and equity in farm machinery influence costs, but are not considered here.

OTHER INFORMATION SOURCES

Custom Rates Annual Survey Summary-1985, Alberta Agriculture, Agdex 825-9, February 1986
Directory of Custom Operators in Alberta 1986, Alberta Agriculture, Agdex 825-17, February 1986
Farm Machinery Costs, Alberta Agriculture, Agdex 825-12, April 1986.
Know Your Farm Machinery Costs, Alberta Agriculture, Agdex 825-6, January 1984
Leasing Farm Machinery, Alberta Agriculture FS 825-13, June 1985
Leasing vs. Buying Farm Machinery, Alberta Agriculture, Agdex 825-19, May 1985
Replacing Farm Machinery, Alberta Agriculture, Agdex 825-18 July 1983
U.G.G. Grain Growers Manual, Engineering Section.
What is a Fair Charge For Custom Work?, Alberta Agriculture, Agdex 825-15, July 1983

TRACTORS - 2 WHEEL DRIVE (2WD)

Years Life = 13
Annual Use = 200, 400*, 600
Annual Repair Rate = 3% of Replacement Cost

2WD PTO HP	Annual Hours Used	Diesel Use	Current Replace Cost	Fixed Cost	Variable Cost (Labor Omitted**)	TOTAL Machine Cost	Profit Margin 30 % of Var. Cost	Cost + Profit Basis For Custom Charge	Market Rate Survey
		litres/Hr	$	$/Hr	$/Hr	$/Hr	$/Hr	$/Hr	1985
40 HP	200	8	19000	14.84	3.27	18.11	0.98	19.09	$.20 per PTO HP/HR
	400			7.42		10.69		11.67	
	600			4.95		8.21		9.19	
60 HP	200	13	24000	18.75	4.79	23.54	1.44	24.97	
	400			9.37		14.16		15.60	
	600			6.25		11.04		12.48	
80 HP	200	17	30000	23.43	6.16	29.59	1.85	31.44	
	400			11.72		17.88		19.73	
	600			7.81		13.97		15.82	
100 HP	200	22	50000	39.06	8.81	47.87	2.64	50.51	$.18 per PTO HP/HR
	400			19.53		28.34		30.98	
	600			13.02		21.83		24.47	
120 HP	200	28	55000	42.96	10.57	53.53	3.17	56.70	
	400			21.48		32.05		35.22	
	600			14.32		24.88		28.05	
140 HP	200	32	61000	47.65	11.94	59.59	3.58	63.17	
	400			23.83		35.76		39.34	
	600			15.88		27.82		31.40	
160 HP	200	38	68000	53.12	13.84	66.96	4.15	71.11	
	400			26.56		40.40		44.55	
	600			17.71		31.55		35.70	
180 HP	200	39	73000	57.02	14.45	71.47	4.33	75.80	
	400			28.51		42.96		47.29	
	600			19.01		33.45		37.79	

* The 400 Annual Hours Use figure is typical.

** To avoid duplication, labor is not charged in the tractor cost calculation. Labor is included in the cost of tractor plus implement and self-propelled operations.

Front Wheel Assist option at $11000- $14000 adds $4.00-$5.00 per hour to the fixed cost.

Years Life = 13
Annual Use = 200, 400*, 600
Annual Repair Rate = 3% of Replacement Cost

TRACTORS - 4 WHEEL DRIVE (4WD)

4WD Engine HP	Annual Hours Used	Diesel Use	Current Replace Cost	Fixed Cost	Variable Cost (Labor Omitted**)	TOTAL Machine Cost	Profit Margin 30 % of Var. Cost	Cost + Profit Basis For Custom Charge	Market Rate Survey
		litres/Hr	$	$/Hr	$/Hr	$/Hr	$/Hr	$/Hr	1985
175 HP	200	34	70000	54.68	13.07	67.75	3.92	71.67	$.18 per PTO HP/HR
	400			27.34		40.41		44.33	
	600			18.23		31.30		35.22	
220 HP	200	40	88000	68.74	15.80	84.54	4.74	89.28	
	400			34.37		50.17		54.91	
	600			22.91		38.71		43.45	
250 HP	200	50	95000	74.21	18.63	92.83	5.59	98.42	
	400			37.10		55.73		61.32	
	600			24.74		43.36		48.95	
275 HP	200	53	115000	89.83	20.82	110.65	6.24	116.89	
	400			44.92		65.73		71.98	
	600			29.94		50.76		57.00	
300 HP	200	58	125000	97.64	22.72	120.36	6.81	127.17	
	400			48.82		71.54		78.35	
	600			32.55		55.26		62.08	
350 HP ***	200	62	135000	105.45	24.39	129.84	7.32	137.16	
	400			52.73		77.11		84.43	
	600			35.15		59.54		66.85	
450 HP ***	200	85	165000	128.89	31.93	160.82	9.58	170.39	
	400			64.45		96.37		105.95	
	600			42.96		74.89		84.47	

* The 400 Annual Hours Use figure is typical.

** To avoid duplication, <u>labor is not charged in the tractor cost calculation.</u> Labor is included in the cost of tractor plus implement and self-propelled operations.

*** Priced without PTO.

CULTIVATION EQUIPMENT

Implement	Tractor HP	Current Replace Cost	POWER UNIT OR SP UNIT Fixed Cost	POWER UNIT OR SP UNIT Variable Cost	IMPLEMENT Fixed Cost	IMPLEMENT Variable Cost	TOTAL Machine Cost	Profit Margin 40% (Var Costs + $ 8.00 Labor)	Full Cost + Profit Basis For Custom Charge **			Market Rate Survey
		$	$/Hr	$/Hr	$/Hr	$/Hr	$/Hr	$/Hr	$/Hr	Ac/Hr	$/Acre	1985
PLOWS		Life = 15	Annual Hours Use = 150					Annual Repair Rate = 6%	Replace Cost			
3 X 16" 3 Point	60	4500	9.37	4.79	4.41	1.80	20.37	5.84	34.21	2.0	17.10	$ 6.00-
5 x 16" Semi 3 pt	120	8500	21.48	10.57	8.33	3.40	43.78	8.79	60.56	3.0	20.19	$20.00
6 x 18" Trailing	140	11000	23.83	11.94	10.78	4.40	50.94	9.73	68.67	4.0	17.17	per
8 x 16" Trailing	220	13500	34.37	15.80	13.23	5.40	68.80	11.68	88.48	6.0	14.75	Acre
10 x 18" Trailing	250	16000	37.10	18.63	15.68	6.40	77.81	13.21	99.02	7.0	14.15	
HD CULTIVATORS W/ MULTIPLEX HARROWS		Life = 15	Annual Hours Use = 250					Annual Repair Rate = 6%	Replace Cost			
14' Single	80	8000	11.72	6.16	4.70	1.92	24.50	6.43	38.93	7.0	5.56	
22' Wing	120	12500	21.48	10.57	7.35	3.00	42.40	8.63	59.02	11.0	5.37	
31' Wing	160	19000	26.56	13.84	11.17	4.56	56.13	10.56	74.69	15.0	4.98	
42' Wing	220	22000	34.37	15.80	12.94	5.28	68.39	11.63	88.02	20.0	4.40	
60' Wing	350	32000	52.73	24.39	18.82	7.68	103.61	16.03	127.63	30.0	4.25	
FIELD CULTIVATORS W/ MULTIPLEX HARROWS		Life = 15	Annual Hours Use = 250					Annual Repair Rate = 6%	Replace Cost			$3.00- $7.50 per Acre
16' Wing	60	8000	9.37	4.79	4.70	1.92	20.79	5.88	34.67	8.5	4.08	
22' Wing	80	10500	11.72	6.16	6.17	2.52	26.57	6.67	41.24	12.0	3.44	
32' Wing	120	12500	21.48	10.57	7.35	3.00	42.40	8.63	59.02	17.0	3.47	
42' Wing	160	18000	26.56	13.84	10.58	4.32	55.30	10.46	73.77	22.0	3.35	
DISCS - TANDEM HD		Life = 15	Annual Hours Use = 150					Annual Repair Rate = 6%	Replace Cost			
16' Single	100	10000	19.53	8.81	9.80	4.00	42.14	8.32	58.46	7.5	7.80	$ 5.00-
24' Wing	140	23000	23.83	11.94	22.54	9.20	67.50	11.65	87.15	12.0	7.26	$11.00
30' Wing	220	26500	34.37	15.80	25.97	10.60	86.74	13.76	108.50	16.5	6.58	per
16' Heavy Offset	140	18000	23.83	11.94	17.64	7.20	60.60	10.85	79.45	7.5	10.59	Acre
ROTOVATORS		Life = 15	Annual Hours Use = 100					Annual Repair Rate = 6%	Replace Cost			
5' Rotor	80	9000	11.72	6.16	13.23	5.40	36.51	7.82	52.33	1.5	34.89	
6' Rotor	120	12500	21.48	10.57	18.38	7.50	57.92	10.43	76.35	2.5	30.54	
V-BLADE		Life = 15	Annual Hours Use = 150					Annual Repair Rate = 6%	Replace Cost			
21'	100	13000	19.53	8.81	12.74	5.20	46.28	8.80	63.08	11.0	5.73	
28'	160	16000	26.56	13.84	15.68	6.40	62.48	11.30	81.78	15.0	5.45	
42'	250	25000	37.10	18.63	24.50	10.00	90.23	14.65	112.88	20.0	5.64	

** Full Cost + Profit Basis for Custom Charge. Includes Labor at $ 8.00 per Hour.

400 Annual Hours of Tractor Use figures are used to determine above Power Unit Costs.

CULTIVATION, SEEDING & SPRAYING EQUIPMENT

Implement	Tractor HP	Current Replace Cost	POWER UNIT OR SP UNIT Fixed Cost	POWER UNIT OR SP UNIT Variable Cost	IMPLEMENT Fixed Cost	IMPLEMENT Variable Cost	TOTAL Machine Cost	Profit Margin 40% (Var Costs + $ 8.00 Labor)	Full Cost + Profit Basis For Custom Charge **			Market Rate Survey
		$	$/Hr	$/Hr	$/Hr	$/Hr	$/Hr	$/Hr	$/Hr	Ac/Hr	$/Acre	1985
ROD WEEDER WITH MULTIPLEX HARROWS	Life = 15		Annual Hours Use = 150				Annual Repair Rate = 6%		Replace Cost			
24'	100	9000	19.53	8.81	8.82	3.60	40.76	8.16	56.92	12.0	4.74	
36'	120	12500	21.48	10.57	12.25	5.00	49.30	9.43	66.72	16.0	4.17	
48'	160	18000	26.56	13.84	17.64	7.20	65.24	11.62	84.86	25.0	3.39	
HARROWS	Life = 15		Annual Hours Use = 40				Annual Repair Rate = 2%		Replace Cost			
Spring Tooth 50'	80	7000	11.72	6.16	25.73	3.50	49.10	7.06	62.17	35.0	1.78	
Spring Tooth 70'	120	9000	21.48	10.57	33.08	4.50	69.62	9.23	86.85	48.0	1.81	
Harrow Packers 40'	140	16000	23.83	11.94	58.80	8.00	102.56	11.17	121.73	25.0	4.87	
Harrow Packers 70'	180	22000	28.51	14.45	80.85	11.00	134.81	13.38	156.19	44.0	3.55	
SEED DRILLS	Life = 15		Annual Hours Use = 100				Annual Repair Rate = 2%		Replace Cost			
Press Drills 12'	60	15000	9.37	4.79	22.05	3.00	38.21	6.32	53.53	6.5	8.24	$2.20-$6.50 per Acre
End Wheel 12'	60	8500	9.37	4.79	12.50	1.70	28.36	5.80	42.15	6.5	6.49	
Hoe Drill 12'	60	15000	9.37	4.79	22.05	3.00	39.21	6.32	53.53	6.5	8.24	
Zero/Min. Till 12'	60	18000	9.37	4.79	26.46	3.60	44.22	6.56	58.78	4.5	13.06	
AIR SEEDERS WITH CULTIVATORS	Life = 15		Annual Hours Use = 150				Annual Repair Rate = 3%		Replace Cost			
28'	140	33000	23.83	11.94	32.34	6.60	74.70	10.61	93.31	16.5	5.66	
42'	250	47000	37.10	18.63	46.06	9.40	111.19	14.41	133.60	25.0	5.34	
SPRAYER (TRAILER)	Life = 15		Annual Hours Use = 50				Annual Repair Rate = 3%		Replace Cost			
400 Gallon 68'	60	8000	9.37	4.79	23.52	4.80	42.48	7.04	57.52	35.0	1.64	$2.00-$3.50 per Acre
800 Gallon 80'	60	10000	9.37	4.79	29.40	6.00	49.56	7.52	65.08	47.0	1.38	
SPRAYER (SP)	Life = 10		Annual Hours Use = 100				Annual Repair Rate = 3%		Replace Cost			
130 Gallon 54'	60	17000	30.09	5.10			35.19	5.24	48.43	40.0	1.21	
1000 Gal 54' Float	160	110000	194.70	33.00			232.30	16.40	252.10	85.0	2.97	
320 Gallon 45' + 3/4 Ton 4x4	60	20000	35.40	6.00			41.40	5.60	55.00	35.0	1.57	

** Full Cost + Profit Basis for Custom Charge. Includes Labor at $ 8.00 per Hour.

400 Annual Hours of Tractor Use figures are used to determine above Power Unit Costs.

FORAGE EQUIPMENT

Implement	Tractor HP	Current Replace Cost	POWER UNIT OR SP UNIT Fixed Cost	POWER UNIT OR SP UNIT Variable Cost	IMPLEMENT Fixed Cost	IMPLEMENT Variable Cost	TOTAL Machine Cost	Profit Margin 40%(Var Costs + $ 8.00 Labor)	Full Cost + Profit Basis For Custom Charge **			Market Rate Survey
		$	$/Hr	$/Hr	$/Hr	$/Hr	$/Hr	$/Hr	$/Hr	Ac/Hr	$/Acre	1985
SWATHER (SP)	Life = 15		Annual Hours Use = 100					Annual Repair Rate = 3%	Replace Cost			
16' Forage & Grain + Conditioner	60	28000	41.16	11.39			[illegible]	7.76	68.31	7.0	[illegible]	$3.00-$6.00 per Acre
20' Grain	60	24000	35.28	10.19			[illegible]	7.28	60.75	10.0	[illegible]	
SWATHER (PULL-TYPE)	Life = 15		Annual Hours Use = 100					Annual Repair Rate = 3%	Replace Cost			
15' Grain	40	5500	7.42	3.27	8.09	1.65	[illegible]	5.17	33.59	7.5	[illegible]	
24' Grain	60	7000	9.37	4.79	10.29	2.10	[illegible]	5.96	40.51	12.0	[illegible]	
MOWER	Life = 15		Annual Hours Use = 50					Annual Repair Rate = 2%	Replace Cost			
7'	40	4000	7.42	3.27	11.76	1.60	[illegible]	5.15	37.19	3.0	[illegible]	
MOWER CONDITIONER	Life = 15		Annual Hours Use = 100					Annual Repair Rate = 3%	Replace Cost			
14' SP Diesel	70	43000	63.21	16.66			[illegible]	9.86	97.73	7.0	[illegible]	$5.00-$12.00 per Acre
9' PTO	60	12000	9.37	4.79	17.64	3.60	[illegible]	6.56	49.96	5.0	[illegible]	
14' PTO	80	18000	11.72	6.16	26.46	5.40	[illegible]	7.82	65.56	6.5	[illegible]	
RAKE	Life = 15		Annual Hours Use = 50					Annual Repair Rate = 2%	Replace Cost			
9' Parallel Bar	40	4000	7.42	3.27	11.76	1.60	[illegible]	5.15	37.19	5.0	7.44	
FORAGE HARVESTER	Life = 12		Annual Hours Use = 100					Annual Repair Rate = 3%	Replace Cost			
20"	120	18000	21.48	10.57	29.16	5.40	[illegible]	9.59	84.19			$130.00-$190.00 per Hour
26"	180	24000	28.51	14.45	38.88	7.20	[illegible]	11.86	108.90			
DUMP WAGON	Life = 15		Annual Hours Use = 100					Annual Repair Rate = 2%	Replace Cost			
Small (700 cu ft)	0	8000	11.76	1.60			[illegible]	0.64	14.00			
Large (900 cu ft)	0	11000	16.17	2.20			[illegible]	0.88	19.25			

** Full Cost + Profit Basis for Custom Charge. Includes Labor at $ 8.00 per Hour. (No Labor Charge for Dump Wagon)

400 Annual Hours of Tractor Use figures are used to determine above Power Unit Costs.

Implement	Tractor HP	Current Replace Cost	POWER UNIT OR SP UNIT Fixed Cost	POWER UNIT OR SP UNIT Var Cost	IMPLEMENT Fixed Cost	IMPLEMENT Var Cost	TOTAL Machine Cost	Profit Margin 40%(Var Cost + $ 8.00 Labor)	Full Cost + Profit Basis for Custom Charge ** Machine Cost	Bale/Hr	$/Bale	Twine Cost	Total Cost	Market Rate Survey
		$	$/Hr	$/Hr	$/Hr	$/Hr	$/Hr	$/Hr	$/Hr			$/Bale	$/Bale	1985
BALERS (STANDARD)	Life = 10		Annual Hours Use = 80					Annual Repair Rate = 3%	Replace Cost					
Small 14" x 18"	40	10500	7.42	3.27	23.23	3.94	**37.85**	6.08	51.94	200	0.26	0.08	**0.34**	$.25-$.45 per Bale
Large 16" x 18"	60	13500	9.37	4.79	29.87	5.06	**49.10**	7.14	64.24	300	0.21	0.08	**0.29**	
LARGE ROUND	Life = 12		Annual Hours Use = 60					Annual Repair Rate = 2%	Replace Cost					
800 lb. Bale	60	16000	9.37	4.79	43.20	5.33	**62.70**	7.25	**77.95**					$4.00-$7.00 per Bale
1500 lb. Bale	60	19000	9.37	4.79	51.30	6.33	**71.80**	7.65	**87.45**					
BIG SQUARE	Life = 10		Annual Hours Use = 150					Annual Repair Rate = 3%	Replace Cost					
1500-2000 Lb. Bale	160	77000	26.56	13.84	90.86	15.40	**146.66**	14.90	**169.56**					
BALE WAGONS	Life = 12		Annual Hours Use = 80					Annual Repair Rate = 3%	Replace Cost					
SP 160 Bale DS	40	73000	147.83	27.38			**175.20**	14.15	197.35	400	0.49		**0.49**	$.30-$.50 per Bale
PULL 142 Bale	80	28000	11.72	6.16	56.70	10.50	**85.08**	9.86	102.94	300	0.34		**0.34**	
PULL 104 Bale	60	22000	9.37	4.79	44.55	8.25	**66.96**	8.42	83.38	240	0.35		**0.35**	
PULL 55 Bale	40	13000	7.42	3.27	26.33	4.88	**41.89**	6.46	56.34	160	0.35		**0.35**	
STACKERS	Life = 12		Annual Hours Use = 80					Annual Repair Rate = 3%	Replace Cost					
4 ton Rectangular	80	20000	11.72	6.16	40.50	7.50	**65.88**	8.66	**82.54**					
8 ton Rectangular	120	28000	21.48	10.57	56.70	10.50	**99.25**	11.63	**118.87**					

** Full Cost + Profit Basis for Custom Charge. Includes Labor at $ 8.00 per Hour.

400 Annual Hours of Tractor Use figures are used to determine above Power Unit Costs.

COMBINES - SELF PROPELLED (SP) OR PULL TYPE (PTO)

Years Life = 13
Annual Use = 100, 150*, 200
Annual Repair Rate = 3% of Replacement Cost

Combine Cylinder Width	Annual Hours Use	Current Replace Cost	POWER UNIT OR SP UNIT		PTO MACHINE		TOTAL Machine Cost	Profit Margin 40% (Var Cost + $ 8.00 Labor)	Full Cost + Profit Basis for Custom Charge **			Market Rate Survey
			Fixed Cost	Variable Cost	Fixed Cost	Variable Cost						
		$	$/Hr	$/Hr	$/Hr	$/Hr	$/Hr	$/Hr	$/Hr	Ac/Hr	$/Acre	1985
POWER TAKE OFF	100				65.62		**106.06**		124.85		20.81	
44-50 IN CYLINDER	150	42000	21.48	10.57	43.74	8.40	**84.19**	10.79	102.98	6.0	17.16	
(Tractor HP = 120)	200				32.81		**73.26**		92.04		15.34	
LARGE PTO	100				104.67		**161.03**		183.37		21.57	
JD7721,CASE1682,VERS	150	67000	28.51	14.45	69.78	13.40	**126.14**	14.34	148.48	8.5	17.47	
(Tractor HP = 180)	200				52.34		**108.69**		131.03		15.42	
SP DIESEL	100		112.49				**131.95**		150.93		27.44	
45 INCH	150	72000	74.99	19.46			**94.45**	10.98	113.43	5.5	20.62	
(HP = 100)	200		56.24				**75.70**		94.69		17.22	
SP DIESEL	100		137.48				**161.52**		182.34		28.05	
50 INCH	150	88000	91.66	24.04			**115.70**	12.82	136.51	6.5	21.00	
(HP = 120)	200		68.74				**92.78**		113.60		17.48	
SP DIESEL	100		156.23				**183.59**		205.73		24.20	$12.00-
60 INCH	150	100000	104.15	27.36			**131.51**	14.14	153.66	8.5	18.08	$20.00
(HP = 140)	200		78.12				**105.48**		127.62		15.01	per
ROTARY TYPE	100		132.80				**157.16**		178.10		25.44	Acre
(SMALL)	150	85000	88.53	24.36			**112.89**	12.94	133.83	7.0	19.12	
TR76,CASE1640	200		66.40				**90.76**		111.70		15.96	
ROTARY TYPE	100		171.73				**200.55**		223.28		26.27	
(MEDIUM) (HP = 175)	150	115000	114.49	28.82			**143.31**	14.73	166.04	8.5	19.53	
CASE1660,TR86,ACR5	200		85.87				**114.69**		137.42		16.17	
ROTARY TYPE	100		203.10				**238.07**		263.26		27.71	
(LARGE) (HP = 185)	150	130000	135.40	34.97			**170.37**	17.19	195.56	9.5	20.59	
CASE1680,TR96,ACR6	200		101.55				**136.52**		161.71		17.02	
ROTARY TYPE	100		226.53				**267.03**		294.43		28.04	
(LARGEST) (HP = 250)	150	145000	151.02	40.50			**191.52**	19.40	218.92	10.5	20.85	
ACR7,WHITE9720	200		113.27				**153.77**		181.17		17.25	

* The 150 Annual Hours Use figure is typical.

** Full Cost + Profit Basis for Custom Charge. Includes Labor at $ 8.00 per Hour.

The 400 Hours of Annual Tractor Use figures are included in above Power Unit Costs.

Implement	Tractor HP	Current Replace Cost	POWER UNIT OR SP UNIT Fixed Cost	POWER UNIT OR SP UNIT Variable Cost	IMPLEMENT Fixed Cost	IMPLEMENT Variable Cost	TOTAL Machine Cost	Profit Margin 40%(Var Costs + $ 8.00 Labor)	Full Cost + Profit Basis For Custom Charge **			Market Rate Survey
		$	$/Hr	$/Hr	$/Hr	$/Hr	$/Hr	$/Hr	$/Hr	Tonnes/Hr	$/Tonnes	1985
TUB GRINDER	Life = 12		Annual Hours Use = 80			Annual Repair Rate = 3%		Replace Cost				
15 Tonnes/Hour	80	14000	11.72	6.16	28.35	5.25	51.48	7.76	67.24	15.0	4.48	
25 Tonnes/Hour	140	22000	23.83	11.94	44.55	8.25	88.56	11.27	107.83	25.0	4.31	
PORTABLE GRINDER MIXER	Life = 10		Annual Hours Use = 80			Annual Repair Rate = 3%		Replace Cost				
20" Screen	80	9500	11.72	6.16	21.02	3.56	42.46	7.09	57.55			
24" Screen & Bale Shredder	100	14500	19.53	8.81	32.08	5.44	65.86	8.90	82.76			

GRAIN DRYERS	Life = 12	Annual Hours Use = 200			Annual Repair Rate = 3%		Replace Cost		Moisture Drop 20-14% $/Tonne	Moisture Drop 17.5-14% $/Tonne	Market Rate Survey 1985
RECIRCULATING BATCH											
Small Propane = 37 L/Hr	40	10500	7.42	3.27	8.51	7.13	26.32	7.36	41.67	32.06 (1.3T/Hr)	20.84 (2.0T/Hr)	
Medium Propane = 46 L/Hr	40	16000	7.42	3.27	12.96	9.30	32.95	8.23	49.17	28.92 (1.7T/Hr)	18.91 (2.6T/Hr)	
Large Propane = 90 L/Hr	40	25000	7.42	3.27	20.25	17.25	48.19	11.41	67.59	16.90 (4.0T/Hr)	11.27 (6.0T/Hr)	$.13-$.34 per Bushel
CONTINUOUS FLOW											
Small Propane = 90 L/Hr	40	20000	7.42	3.27	16.20	16.50	43.39	11.11	62.49	18.94 (3.3T/Hr)	12.02 (5.2T/Hr)	
Medium Propane = 110 L/Hr	40	26000	7.42	3.27	21.06	20.40	53.15	12.67	72.81	16.55 (4.4T/Hr)	10.40 (7.0T/Hr)	
Large Propane = 145 L/Hr	40	38000	7.42	3.27	30.78	27.45	68.92	15.49	92.40	14.22 (6.5T/Hr)	9.43 (9.8T/Hr)	

** Full Cost + Profit Basis for Custom Charge. Includes Labor at $ 8.00 per Hour.

The 400 Hours of Annual Tractor Use figures are used in the above Power Unit Costs.

FARM TRUCKS

Years Life = 15
Annual Use = 150, 300*, 450
Annual Repair Rate = 3% of Replacement Cost

Truck Size	Annual Hours Used	Fuel Use	Current Replace Cost	Fixed Cost	Variable Cost	TOTAL Truck Cost	Profit Margin 40% (Var Costs + $ 8.00 Labor)	Full Cost + Profit Basis For Custom Charge**	Market Rate Survey
		litres/Hr	$	$/Hr	$/Hr	$/Hr	$/Hr	$/Hr	1985
GENERAL TRUCKING									
2 Ton	150	30.00	21000	20.58	10.38	30.96	7.35	46.31	$4.50-$7.50 per Tonne (Short Haul)
	300			10.29		20.67		36.02	
	450			6.86		17.24		32.59	
3 Ton	150	37.00	26000	25.48	12.81	38.29	8.32	54.62	
	300			12.74		25.55		41.88	
	450			8.49		21.31		37.63	
4 Ton	150	45.00	29000	28.42	15.32	43.74	9.33	61.07	
	300			14.21		29.53		46.86	
	450			9.47		24.79		42.12	
5 Ton Tandem	150	52.00	36000	35.28	17.95	53.23	10.38	71.61	
	300			17.64		35.59		53.97	
	450			11.76		29.71		48.09	

* This Annual Hours Use figure is typical.

** Full Cost + Profit Basis for Custom Charge. Includes Labor at $ 8.00 per Hour.

POINTS TO CONSIDER IN A CUSTOM HIRING AGREEMENT

Custom hiring is a business arrangement. As in all business arrangements, the agreement should outline the rights and duties of all the parties involved. A written agreement is advisable to avoid misunderstandings in case of a dispute. The following points should be considered in a custom hiring agreement.

1. **Operations:** The agreement should provide a description of the exact operations to be performed by the parties and the machines, materials and labor to be supplied by each party.

2. **Timeliness:** Significant losses can occur if an operation is not started or completed on time. To facilitate planning, a custom hiring agreement should include a schedule of operations for both parties. Such a schedule would be subject to weather conditions and crop maturity. Reasonable notice should be provided by each party when circumstances alter the schedule for operations.

3. **Rate Schedule:** The custom operator, for each operation to be performed, should stipulate his rate on the basis of acreage, time (week, day, hour) or total operation performed.

4. **Payment:** The agreement should stipulate the terms of payment for custom operations. The custom operator should bill the client on completion of each custom operation indicating the actual units (acres, hours, etc.) completed, the rate charged per unit, the total charge and the due date for payments.

5. **Down-Time:** The parties should consider a clause in the agreement, regarding responsibility for down-time as a result of machine breakdown.

6. **Termination:** The agreement should include a clause for a minimum period of notice for termination. A penalty should be stated for unjustified termination of the agreement.

7. **Liability:** The parties should consider a clause stipulating the responsibility for liability claims as a result of damage to personal property.

8. **Management:** The custom agreement should secure provisions that the custom operator will employ acceptable management practices in his operations.

For additional information and sample agreements for the above, refer to the publication "Custom Farming Agreement", Alberta Agriculture, Agdex 817-10.

MACHINERY COST WORKSHEET

Machine.....Original Cost.....Annual Hours of Use.....

Replacement Cost .....Sale Value.....Years of Use.....

			Yearly Cost	Hourly Cost
FIXED COSTS (Calculated on Yearly Basis)				
1. Depreciation	= Replacement Cost - Cash Sale Value / Years of Use	$..... - $..... / .....Years	$ _____	
2. Investment Cost	= Original Cash Cost + Cash Sale Value / 2 X Interest Rate	$..... + $..... / 2 X .....%	$ _____	
3. Insurance & Housing	= Original Cash Cost X 1%	$..... X .....%	$ _____	
4. TOTAL FIXED COSTS PER YEAR			$ _____ (A)	
5. TOTAL FIXED COSTS/HOUR	= Total Costs/Year/Hours of Annual Use	$..... ÷ $.....hr		$ _____ (B)
VARIABLE COSTS (Calculated on Hourly Basis) (use following formulas if actual costs are not known)				
1. Fuel Cost	= Litre/Hour X Price/Litre	..... X $..... X	$ _____	
2. Lubrication	= Fuel Cost X 15%	$..... X .....%	$ _____	
3. Repairs	= Original Purchase Price X Annual Repair Rate / Hours of Annual Use	$..... X .....% / .....hrs	$ _____	
4. TOTAL VARIABLE COSTS PER HOUR				$ _____ (C)
5. TOTAL VARIABLE COSTS PER YEAR	= Total Variable Costs/Hour X Hours of Annual Use	$..... X .....hr	$ _____ (D)	

TOTAL COSTS PER YEAR (A+D) = $..... + $..... $ _____

TOTAL COSTS PER HOUR (B+C) = $..... + $..... $ _____

MACHINERY CUSTOM CHARGE WORKSHEET[1]

Operation ..... Power Unit ..... Implement(s) ..... Acres/Hour .....

FIXED COSTS PER HOUR[2]	Power Unit	Machine 1	Machine 2
A. Depreciation	$ _____	$ _____	$ _____
B. Investment Cost	$ _____	$ _____	$ _____
C. Insurance & Housing	$ _____	$ _____	$ _____
D. Total Fixed Cost (A+B+C)	$ _____ (P)	$ _____ (R)	$ _____ (S)
E. Total Fixed Machine(s) Costs (P+R+S)			$ _____ (E)
VARIABLE COSTS PER HOUR[3]			
F. Fuel Cost	$ _____		
G. Lubrication	$ _____	$ _____	$ _____
H. Repairs	$ _____	$ _____	$ _____
I. Total Variable Cost (F+G+H)	$ _____ (T)	$ _____ (U)	$ _____ (V)
J. Total Variable Machine Cost (T+U+V)			$ _____ (J)
K. TOTAL MACHINE COST PER HOUR (E+J)		$ _____ (K)	
L. LABOR COST PER HOUR		$ _____ (L)	
M. PROFIT MARGIN (20-50% of Variable Cost + Labor)		$ _____ (M)	
N. FULL COST + PROFIT (K+L+M)		$ _____ (N)	
O. TOTAL CHARGE/ACRE (N : Acres/Hour)		$ _____	

1 Before using this worksheet, calculate the costs of each machine using the "Machinery Cost Worksheet".
2 Refer to Machinery Cost Worksheet and divide by annual hours of use.
3 Refer to Machinery Cost Worksheet.

FUEL CONSUMPTION FOR VARYING TRACTOR HORSEPOWER[1]

TRACTOR TYPE AND SIZE	AVERAGE DRAWBAR HORSEPOWER[2]		AV. FUEL CONSUMPTION[3] (Litres per Hour)	
	Diesel Tractors	Gasoline Tractors	Diesel Tractors	Gasoline Tractors
Two Wheel Drive PTO HP				
30 - 39	....	31.5	....	10.5
40 - 49	....	38.3	....	12.3
50 - 59	48.2	47.1	10.5	15.0
60 - 69	56.2	55.2	13.6	20.0
70 - 79	65.5	64.5	16.4	23.2
89 - 89	73.5	74.5	17.7	26.8
90 - 99	84.0	82.0	20.5	28.2
100 - 119	90.3	....	22.7	....
120 - 139	111.6	....	28.2	....
140 - 159	128.9	....	32.3	....
160 - 179	145.8	....	38.6	....
Over 180	148.9	....	39.1	....
Four Wheel Drive DBHP				
100 - 149	135.0	....	33.2	....
150 - 174	159.4	....	40.3	....
175 - 199	182.8	....	50.0	....
200 - 224	217.4	....	53.0	....
225 - 249	235.5	....	58.0	....
250 - 274	265.0	....	61.4	....
275 - 299	281.3	....	62.6	....
300 - 349 *	305.0	....	66.4	....
Over 350 *	385.0	....	92.4	....

* Includes only one tractor

NOTES ON FUEL CONSUMPTION TABLE

This data on fuel consumption for different sizes of tractors was calculated from the Nebraska Tractor Tests Reports. The fuel consumption figures are based on "75% of Pull at Maximum Power". These fuel consumption figures are for tractors under normal load in average field conditions. Fuel use per hour will be affected by:-

- load factor (75% is assumed in these estimates
- engine RPM
- gear
- correct engine tuning

While these figures may be a good indication o fuel use per hour for a machine, fuel consumptio per acre will be affected by the Field Efficienc related to each operation. Estimation of total fue consumption should take this factor into account Some factors that can significantly affect fiel efficiency include:-

- wheel slippage
- tire pressure
- tractor ballast
- depth of and sharpness of implement
- soil type and condition
- amount of turning required
- implement overlap in each pass
- down time to refill seed and fertilizer boxe

1 This data was summarized from "Nebraska Tractor Test Summary 1972 through 1981", The Grain Grower, Page 762 (UGG), April, 1982 and from 1980 - 198 Agricultural Yearbook, A.S.A.E, May, 1980, pp 537-545.
2 Average Drawbar Horsepower for all tractors in each range.
3 Average fuel consumption for all tractors in each range.

MACHINERY COSTS ASSUMPTION GUIDE

MACHINE	A Depreciation Lifetime (Years)	B Annual Use (Hours)	C Annual Repair rate % orig.Cost	D Lifetime Repairs % orig.Cost	E Field Efficiency
Tractors	13	600	3%	120%	.....
Combines	12	150	3%	60%	60 - 80%
Cultivators	15	250	3-8%	120%	70 - 90%
Discers	15	150	3%	120%	70 - 90%
Rodweeders	15	100	2%	100%	70 - 90%
Seed Drills	15	100	2%	100%	65 - 80%
Harrows, Packers	15	40	2%	120%	70 - 90%
Sprayers	15	50	2%	80%	50 - 80%
Stone Pickers	15	40	2%	100%	50 - 80%
Swathers	15	100	3%	95%	70 - 85%
Movers & Rakes	15	50	2%	100%	60 - 90%
Mower-Conditioner	15	50	2%	100%	60 - 85%
Forage Harvester	15	80	3%	80%	50 - 80%
Balers					
Standard	10	80	3%	80%	60 - 85%
Large Round	12	60	2%	60	60 - 85%
Grain Dryers	12	200	3%	...	.....
Loaders	15	40	2%	90%	.....

NOTES ON COLUMN HEADINGS

A. Estimated average number of years until a machine depreciates to 10% of original cash cost.

B. Estimated average annual farm use.

C. Estimates are based on average conditions and the indicated annual hours of use.

D. Total repairs as a percent of the original cash cost. Repairs are usually low in the first years before they begin to increase at an increasing rate as the machine wears out. These figures could be viewed as a maximum since they reflect high rates in later years.

E. Field Efficiency is a percentage estimate of the amount of time machinery is actually in use relative to the total time required to complete an operation (refer also opposite page).

ACRES PER HOUR

Acres per hour (or "Effective Field Capacity") can be calculated using the following formula:-

$$\text{Acres per hour (Effective field Capacity)} = \frac{\text{machine width (ft)} \times \text{speed (mph)} \times \text{field efficiency}}{8.25}$$

E.G. A 31' cultivator travelling at 5 m.p.h. operating at 80% field efficiency would have an effective field capacity of:-

$$\text{Acres per hour} = \frac{31 \times 5 \times .80}{8.25} = 15 \text{ ac/hr}$$

MY EQUIPMENT COSTS

MACHINE TYPE	FIXED COSTS		VARIABLE COSTS		TOTAL COSTS Per Hour	LABOR Per Hour	PROFIT MARGIN Per Hour	FULL COST + PROFIT Per Hour
	Total	Per Hour	Total	Per Hour				

1 Costs for your own equipment can be calculated using the Worksheet on page 13.